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ABSTRACT

This study compared the effectiveness of computer simulation with that of traditional videotaped role playing in a helping skills course for nurses. Subjects were 78 nursing students at the University of Minnesota's School of Nursing who enrolled in a helping relationships course during either the winter or spring quarter of 1987. During each quarter, two instructors offered two sections each of the helping relationships course. Within each combination of quarter, instructor, and section, students were randomly assigned to receive either videotaped role play followed by the computer simulated roleplay, or the computer simulation followed by the videotaped role play. This resulted in a 2x2x2x2 generalized randomized block design. Students were tested at three time points while they counseled a coached client: after the didactic portion of the course, after the first role play, and after both role plays. Audio recordings of each testing session were made. After the third test, the tapes were given in random order to an external rater who was certified to use the Helping Skills Verbal Response Inventory (HSVRS) by its authors. The dependent variables were 6 of the 10 available rating categories on the HSVRS: (1) affect; (2) content; (3) open questions; (4) closed questions; (5) advice; and (6) influence. A 2x2x2x2 multivariate analysis of variance (MANOVA) was carried out separately on each set of gain scores. The video role play was found to be somewhat more effective than the computer simulation in the development of helping skills. This advantage, however, is dependent upon the skill of the instructor who provides the videotape feedback. (30 references) (GL)

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A Comparison of Computer Simulation and Video-taped Roleplays as Instructional Methods in the Teaching of Specific Interviewing Skills

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A Paper Presented at the Annual Meeting of the American Educational Research Association

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In 1976, Danish and D'Augelli stated that the generic goal of any training for human service workers is to facilitate their interpersonal helpfulness. They report that a wide variety of professional and paraprofessional human service workers, including counselors, psychologists, teachers, crisis center personnel, nurses, physicians, dentists, lawyers, and police can benefit from systematic training focusing on specific helper skills. Danish and D'Augelli called for psychologists to contribute their expertise when they said, "Mental health professionals must be involved in the design, implementation, and evaluation of this training" (p.45).

The study reported here is consistent with Danish and D'Augelli's (1976) recommendation in that educational psychologists, specializing in counseling, became involved in the design and evaluation of a helping skills course for nurses. Specifically, an existing helping skills course was modified a) to include a computer simulation of counseling and b) to allow for the comparison of the computer simulation's effectiveness with that of a previously used technique of videotaped roleplay with a simulated client.

While simulations of clinical practice have been used quite extensively in both research (Munley, 1974) and in the training of clinical problem solving skills and interviewing techniques (Bervin & Scofield, 1980), computer simulations are relatively new. Cairo (1983) and Cairo & Kanner (1984) have called for 1) research that evaluates the extent to which computer simulations assist in the achievement of overall counseling goals and 2) research that compares computerized approaches with traditional training methods. Recent innovations in computer technology provide new and unexplored opportunities for this type of research. Traditional roleplays, the "live simulations" which are extended interactions between a person portraying a client and a subject (Bervin & Scofield,

1980), have been effectively paired with the use of videotaping and are commonly recognized as a very important tool in communications training (Thayer, 1977). This videotaped simulation technique, called self-confrontation, has been used extensively by many programs that teach helping skills (Danish & Hauer, 1973; Ivey, 1971; Kagen, 1975; Truax & Carkhuff, 1967).

While self-confrontation has been found to be an effective training technique, it is not without drawbacks. Research has revealed that without skilled trainer feedback during the viewing of videotaped roleplays, self-confrontation does not increase trainees' skills, and perhaps could be damaging to the trainee (Ford, 1979; Fuller & Manning, 1973). This method is also time consuming for the experienced trainer and, as a result, can be quite expensive. Students are usually given only limited opportunities to utilize videotaped self-confrontation and feedback rather than completing comprehensive training programs that have been demonstrated by research to be effective. Many studies have found that trainee anxiety often accompanies self-confrontation (Ho, Hosford, & Johnson, 1985; Yenawine & Arbuckle, 1971; Poling, 1968). Several fears have been identified: self-exposure, facing inadequacies, receiving criticism, and supervisor's presence. Skill acquisition can be disrupted by this anxiety (Nielsen, 1964; Perlberg, Peri, Weinreb, Nitzan, Shimbrod, & O'Bryant, 1971; Steward & Steward, 1970) and the trainee often becomes preoccupied with his/her deficiencies rather than the task at hand (Sarason,1976).

The long standing training technique of simulating client and helper interactions is now being done with computers. The computer, programmed to respond as a client would, can provide simulated counseling experiences that allow students to try out newly acquired skills in a variety of ways (Phillips, 1983).

Halpain, Dixon, & Glover (1987) used computer-assisted instruction to teach classic methods of psychotherapy to beginning counselors. Transcripts representing classic therapy styles were incorporated into a menu driven computer program. The client's statement was presented on the computer screen and the trainee typed in a response. An expert therapist's actual response to the client, taken from the original transcript, then appeared on the screen. This allowed the trainee to compare his/her response with that of the expert therapist. The program continued in the same manner with the next client statement from the transcript appearing on the screen. Client statements in Halpain et al.'s program were in no way dependent upon the trainee's responses, as they are in the simulation reported on in this paper. Halpain et al. compared the students' knowledge of content and techniques of the theories they were exposed to through the computer simulation with their understanding of theories to which they had not been exposed. Significant differences were not found on the knowledge posttest.

Other documented uses of computers to teach counseling (helping) skills are few and far between (Phillips, 1983). Some of the best examples are found in the health professions, particularly for interview training. The available research is limited, but nonetheless encouraging.

A study conducted by Droste-Bielak (1980) compared the use of computer simulation and traditional role playing in the teaching of interviewing skills to 45 junior nursing students. The computer simulation allowed the subjects to practice gathering complete data in a logical sequence and receiving feedback from a "built-in" instructor. The role play treatment paired students with each other to practice data gathering interviews. All subjects' skill learning was evaluated through the rating of audio tapes of real client conversations. No significant

differences were found between the two treatment groups in either the amount of data collected or in the number of errors made in interviewing technique. The author concluded that computer simulation was as effective as role play in teaching interviewing techniques.

In a study of dental history interviewing (Brody, Lucaccini, Kamp, & Rozen, 1973), a computer simulated patient was used to allow students an opportunity to practice compiling relevant medical information needed to formulate a dental diagnosis. An entire class of 75 students was blocked into 15 groups on the basis of grade point average. Thirty dental students, composed of two students from each group randomly assigned to either the experimental or control group, participated in the study. All of the students received the same classroom instruction. Fifteen students then used a computer simulation exercise to complete a dental history on a client, determine a diagnosis, and receive computer feedback on their performance. After completing the simulation, each student conducted an actual videotaped interview with a client. The other group of 15 students conducted a videotaped interview with a client without receiving any additional instruction beyond what both groups had received. Evaluation of both sets of interviews showed significantly better performance for the groups that had completed the computer simulation exercise. A second performance comparison was made after the group which did not complete the computer simulation received feedback about their videotape from an instructor and then made a second videotape. Comparisons between the computer simulation subjects' first interviews and the second interviews of the instructor feedback group favored neither group. While this study does not establish the superiority of computer

simulation, it does suggest it is a viable teaching tool that allows for skill development before an actual patient becomes involved.

The studies conducted by Droste-Bielak (1980) and Brody et al. (1973) used computer simulation to teach history taking skills. Neither study provides information about how useful computers could be in training helpers to learn the more typical interpersonal counseling skills associated with empathy.

Brody et al. (1973), Droste-Bielak (1980), and Halpain et al. (1987) all used student opinion questionnaires to gather additional evaluative information about the use of computer simulation as a training technique. All three studies found very positive student reactions to the computer simulation experience.

In summary, information about whether interactive computer simulation is useful in training students to develop helping skills associated with empathy is not available. The feasibility of developing computer programs that could teach empathy related skills has been established by the program, CLIENT 1 (Hummel, Lichtenberg, & Shaffer, 1975; Lichtenberg, Hummel, & Shaffer, 1984). CLIENT 1 allows helpers to interact with a client whose behavior in an initial interview has been simulated. The computer simulation examined in this study, ROLEPLAY (Hummel, 1985), is an extension of CLIENT 1. Students are able to practice behaviors and receive feedback. If needed they can repeat the same set of circumstances until their performance improves and they feel confident in moving on to more demanding scenarios.

When used in helper training programs, computer simulations are efficient because they can be used quite independently by trainees, alleviating the problems of extensive trainer involvement. Since the computer simulation can evaluate performance, a supervisor need only intervene when a student is stuck

and can no longer make independent progress. The independent use of computer simulations could also reduce trainees' anxiety often associated with critique of their unskilled performance. In addition to saving resources and increasing flexibility in delivery, computer simulations of interpersonal interactions introduce a structure and formalism which might be absorbed by the student and be used for productive "self-talk" and planning, a kind of "inner counseling" (Kurpius & Morran, 1987).

METHOD

To compare computer simulation with traditional video-taped roleplays, a randomized comparative experiment was designed.

Subjects:

The subjects were 78 nurses in training at the University of Minnesota's School of Nursing who enrolled in a helping relationships course during either the winter or spring quarter of 1987.

Design:

During each quarter, two instructors offered two sections each (morning and afternoon) of the helping relationships course. Within each combination of quarter, instructor, and section, students were randomly assigned to receive either videotaped roleplay followed by a computer simulated roleplay or the computer simulation followed by the videotaped roleplay. This, then, resulted in a 2x2x2x2 generalized randomized block design (winter/spring by teacher 1/teacher 2 by morning/afternoon by video-first/computer-first). Students were tested at three time

points, after the didactic portion of the course, after the first roleplay (video or computer), and after both roleplays (video and computer).

Dependent Variables:

The dependent variables were six of the ten available rating categories on The Helping Skills Verbal Response System (HSVRS) (Danish, D'Augelli, & Brock, 1974), which has been frequently used in counseling process research. These six categories are defined as follows:

Affect	"A statement in which the helper reflects a feeling which the helpee has not yet labeled."
Content	"A statement which summarizes or reflects the content of the prior statement or statements."
Open Questions	"Questions that cannot be answered "yes," "no," or with one or two words."
Closed Questions	"Questions that can be answered "yes," "no," or with one or two words."
Advice	"A statement that provides an alternative mode of behavior (actions or thoughts) for the helpee."
Influence	"A statement used to change the attitudes, beliefs, and, indirectly, the behavior of the helpee" (Danish, D'Augelli, & Brock, 1976, p. 261).

Students counseled a coached client for four minutes and an audio recording was made. This was done at the three time points mentioned above. After the third test, the tapes were given in random order to a rater who was certified to use the HSVRS by its authors. This rater had not previously been involved in the study.

Procedures:

Both teachers followed a standard outline for class activities and assigned the same reading, written, and fieldwork assignments during the first nine hour-and-a-half classes. All students were audiotaped counseling a coached client in the tenth class period. During the 11th and 12th class period students received either the video roleplay treatment or computer simulation treatment. In the 13th class period all students were audiotaped again, followed by the 14th and 15th class sessions when the students underwent the treatment they had yet to receive. All students were audiotaped a third time during the 16th class session. After the completion of each treatment, students were asked to complete a survey about their reactions to the training experience.

During the videotaped roleplay each student played the role of a helper in a four minute videotaped dialogue with the instructor playing a coached client. The students were told to practice the techniques of reflection and probe during the roleplay. After the students had all been videotaped, the four to six students as a group viewed the tapes with the instructor. The instructor stopped the tape where appropriate and gave feedback about effective and non-effective uses of the reflection and probe techniques. Class discussion was utilized when appropriate. Each student had the opportunity to be videotaped twice with two different coached client roles.

During the computer simulation treatment approximately twelve students met in a classroom equipped with an IBM personal computer for each student to use. The teacher provided instructions about how to operate the computers, gave an introduction to the computer simulation, and offered assistance during the simulation practice. The computer simulation, ROLEPLAY (Hummel, 1985) is an

enhanced version of CLIENT 1 (Hummel et al., 1975) that has been programmed for use on IBM and compatible personal computers. ROLEPLAY is a computer simulation of an initial counseling interview. Client statements are communicated on the computer monitor and the helper constructs responses by selecting leads, affects, content areas, person references, qualifying phrases, and connecting prepositions from menus that appear on the monitor. The client responds with statements that are dependent upon such factors as threat of the topic, strength of the relationship, and helper competence as reflected in the content and sequencing of the helper's statements. The helper's task is to move the client toward identification of a problem on which future assistance might focus. After each helper response, the subject has the option of selecting feedback which provides a graph on the monitor depicting how the trust level is developing in the relationship and whether the last helper response was an effective or ineffective reflection or probe. Students spent two class meetings using the simulation.

Analysis:

A 2x2x2x2 multivariate analysis of variance (MANOVA) was carried out separately on each set of gain scores (testing two minus testing one, testing three minus testing two, and testing three minus one).

Prior to carrying out these analyses, three subjects were dropped because they had missed two testing periods. Missing data in the remaining 75 cases represented a data loss of only nine percent and was dealt with by estimation using an iterated multiple regression procedure on the frequencies of response (Raymond & Roberts, 1987). The 10 frequencies for each set of ratings on the HSVRS were converted to percentages on a case by case basis. Four of the ten

categories were then dropped to remove linear dependency in the data and eliminate categories which are 1) of little interest, 2) have response patterns that were unproductive to examine, or 3) have not been reported in previous research.

The cell sizes in this 16 cell design varied from four to six cases. This disproportionality introduced some dependency between the effects in the model, which was dealt with by conditioning each effect for all the other effects in the model. While the full model was used in deterrnining the error term in the analyses, only effects involving Treatment were tested.

RESULTS

The MANOVA on the differences between the percentages attained at testing one and testing two assessed the degree of change in the percentage of responses in each of the six categories of the HSVRS. Only the main effect for Treatment, $F(6, 54) = 2.861$, $p<.01$, and the two-way interaction between Treatment by Teacher, $F(6, 54) = 4.252$, $p<.001$, were significant. Following the common practice of not interpreting a main effect in the presence of an interaction, we shall only present results for the Treatment by Teacher interaction. Since the students at the time of testing two had received only one roleplay (either video or computer), this analysis provides the comparison between the video roleplay and computer roleplay.

Univariate ANOVAs on the treatment by teacher interactions found significance for three of the six dependent variables. These results are presented in Tables One and Two. For Teacher One, the video roleplay was more effective in bringing about the desirable outcomes of increasing affect responses, $t(33) =$

5.371, $p<.001$, and decreasing influence statements, $t(33) = -2.365$, $p<.05$. For Teacher Two, the computer was more effective for the desirable outcome of increased open questions, $t(38) = -2.448$, $p<.05$.

The second MANOVA analyzed the changes in percentages between testing time two and testing time three. This would reflect change due to a second and different treatment. The only significant effect revealed by this analysis was the main effect for Treatment, $F(6, 54) = 3.013$, $p<.01$. Follow-up univariate analyses of this effect identified a difference for affect responses and advice (see Tables Three and Four). The changes here indicate an improvement in the performance of students who received the video roleplay treatment as their second roleplay experience.

Table One

Analysis of Variance for Teacher x Treatment Interaction For Test 2 Minus Test 1 Gain Scores

Variable Name	Source	DF	MS	F	p
Affect	Tchr x Trt	1	1570.684	16.850	.001
	Error	59	93.216		
Open Questions	Tchr x Trt	1	888.675	5.881	.018
	Error	59	151.097		
Influence	Tchr x Trt	1	1616.871	6.046	.017
	Error	59	267.443		

Table Two

Teacher by Treatment Interaction Means For Test 2 Minus Test 1 Gain Scores

Variable Name	Teacher 1		Teacher 2		SD*
	Video 1st	Video 2nd	Video 1st	Video 2nd	
Affect	11.389	-6.15	.597	1.693	9.655
Open Questions	4.816	.961	-8.571	.955	12.292
Influence	-7.469	5.612	3.997	.444	16.354
Sample Size	18	17	19	21	75

* SD is square root of Mean Square Error

Table Three

Analysis of Variance for Treatment Effect For Test 3 Minus Test 2 Gain Scores

Variable Name	Source	DF	MS	F	p
Affect	Treatment	1	1005.228	14.494	.001
	Error	59	69.355		
Advice	Treatment	1	283.475	7.606	.008
	Error	59	37.271		

Table Four

Treatment Effect for Test 3 Minus Test 2 Gain Scores

Variable Name	Video 1st	Video 2nd	SD*
Affect	-1.79	5.425	8.328
Advice	-.545	-4.504	6.105
Sample Size	38	37	75

* SD is square root of Mean Square Error

Differences in gain between Testing One and Testing Three were analyzed with a third MANOVA. No significant differences were found for any of the main effects or interactions.

To determine if the combined simulations were effective, averaging over treatment, teacher, section, and quarter, the grand mean differences between Test One and Test Three were analyzed. The MANOVA for these grand mean differences was statistically significant, $F_{(1,59)} = 7.080$, $p<.01$. Follow-up univariate analyses indicated that the students changed significantly on four of six variables (See Tables Five and Six.) All changes were in the desired direction.

Table Five

Analysis of Variance for Grand Means For Test 3 Minus Test 1 Gain Scores

Variable Name	Source	DF	MS	F	p
Affect	Grand Mean	1	882.982	8.405	.005
	Error	59	105.056		
Content	Grand Mean	1	5675.168	19.461	.001
	Error	59	291.616		
Closed Questions	Grand Mean	1	1456.309	4.541	.037
	Error	59	320.672		
Advice	Grand Mean	1	872.985	12.949	.001
	Error	59	67.417		

Table Six

Grand Means for Test 3 Minus Test 1 Gain Scores

Variable Name	Grand Mean	SD*
Affect	3.474	10.249
Content	8.822	17.077
Closed Questions	-4.196	17.907
Advice	-3.374	8.211
Sample Size	75	75

* SD is square root of Mean Square Error

Following each treatment, a 14 item questionnaire was administered to gather data about students' opinions regarding the computer and video roleplays. In general, student reactions to both treatments were quite positive. In comparing the two treatments, many of the differences were unimportant. While the students believed that video was slightly more helpful, particularly for reflecting, paraphrasing, and probing, the largest single difference was that students found the computer treatment to be less threatening and anxiety producing.

DISCUSSION

Based on the above results we believe that the video roleplay is somewhat more effective than the computer simulation in the development of helping skills. This advantage, however, is dependent upon the skill of the instructor that provides the videotape feedback. The teacher who conducted the more successful videotape roleplay had more experience with videotape roleplays and feedback and was more knowledgeable about counseling techniques. The computer simulation was more successful with the less experienced teacher, mainly because the students in the video treatment remained the same or declined in performance, while those who received the computer simulation remained the same or increased slightly. Improvements in performance brought about by the second treatment favor video. This would seem to be due to students who received the computer first. Their performance, which was slightly poorer than those who received video first, improved and resulted in comparable performance to those who received video first and computer second. Although there does not seem to be any effect due to the ordering of treatments, i.e. computer and then video vs. video and then

computer, the combined simulations of computer and video were found to be effective.

This study provides information about the use of computers in training helping professionals. While it is difficult to support broad generalizations about the effectiveness of the two media on the basis of this one study, it does not suggest that the development of computer simulations for use in interpersonal skills training should be abandoned. Additional studies are needed to show the effects of more complex and sophisticated computer simulations, and the effects of using computer simulations that become more complex as learners' skills increase. If further studies show that computer simulation is at least as effective as videotaped roleplay, this method may prove to be a valuable way to provide extensive opportunities for practice that does not require costly instructor time.

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